CLAIMS

I claim:

1. A chemical screening method comprising the steps of:

preparing a plurality of solutions each containing a different molar weight ratio of an active ingredient to a carrier molecule in a solvent;

placing at least one drop of each said solution on at least one flat and reflective substrate to enhance a constructive interference and a destructive interference of a light wave propogating through a solid dispersion thin film;

spin casting said flat and reflective substrate with each said solution using a conventional spin-casting apparatus at a specific temperature and a specific pressure until the solvent has evaporated leaving the solid dispersion thin film;

placing each said flat and reflective substrate containing the solid dispersion thin film in a spectrometric instrument to use a reflective mode to produce a micrograph; and

analyzing the micrograph of each of the solid dispersion thin film to determine the extent of crystallization;

whereby the chemical screening method determines at least the solution of the molar weight ratio of active ingredient to carrier molecule where maximum dissolution and crystallization occur.

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2. The chemical screening method of claim 1, wherein the spectrometric instrument is selected from the group consisting of an optical microscope, RAMAN microscope, infrared microscope, scanning electron microscope and atomic force microscope.

3. A chemical screening method comprising the steps of:

a) preparing a plurality of solutions each containing a different molar weight ratio of an active ingredient to a carrier molecule in a solvent;

b) placing at least one drop of each said solution on at least one silicon wafer chip;

c) spin casting the silicon wafer chips with each said solution using a conventional spin-casting apparatus at a specific temperature and a specific pressure until the solvent has evaporated leaving a solid dispersion thin film;

d) placing each silicon wafer chip containing the solid dispersion thin film in an optical microscope to produce an optical micrograph; and

e) analyzing the optical micrograph of each solid dispersion thin film to determine the extent of crystallization;

whereby the chemical screening method determines at least the solution of the molar weight ratio of the active ingredient to carrier molecule were maximum dissolution and crystallization occur.

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4. The chemical screening method of claim 3, further comprising the step of selecting said specific active ingredient, which is an organic or inorganic crystalline chemical compound.

5. The chemical screening method of claim 3, wherein said carrier molecule is an organic or inorganic compound selected from the group consisting of cellulose, starches, saccharides, hydrogentated saccharides, fats, glycerine, gums, lecithins, chitosans, gelatins, polymers and surfactants.

6. The chemical screening method of claim 3, further comprising the step of selecting the specific solvent based on a determination of the solubility of the active ingredient and the carrier molecule.

7. The chemical screening method of claim 3, wherein said solvent is selected from the group consisting of water, N,N-Dimethylformamide (DMF), N,N=Dimethylacetamide (DMA), methyl sulfoxide (DMSO), acetone, acetonitrile, methanol, ehtanol, isopropanol, n-butanol, tetrahydrofuran (THF), 4-methyl-2-pentanone (MIBK), 2-butanone (MEK), toluene, heptane, cyclohexane, ethyl acetate, n-butyl acetate, isopropyl acetate, and 2-methyltetrahydrofuran.

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8. The chemical screening method of claim 3, further comprising the step of using the silicon wafer chip, which has a flat and reflective surface to maximize use of an optical micrograph, RAMAN microscopy, infrared microscopy, electron microscopy, spectroscopy, X-ray diffraction, dielectric measurements and thermal analysis.

9. The chemical screening method of claim 3, further comprising the step of preparing said series of solutions through conventional laboratory methods.

10. The chemical screening method of claim 3, further comprising the step of preparing said series of solutions through automation using at least a solid dispensor and at least a liquid dispensor.

11. The chemical screening method of claim 3, wherein the preferred molar weight ratios of said active ingredient to said carrier molecule are 1:10, 1:9, 1:8, 1:7, 1:6, 1:5, 1:4, 1:3, 1:2, 1:1, 2:1, 3:1, 4:1, 5:1, 6:1, 7:1, 8:1, 9:1 and 10:1.

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12. The chemical screening method of claim 3, wherein said active ingredient and said carrier molecule are completely co-dissolved in said solvent under a temperature in the range between substantially zero (0) degrees celsius and the lowest among the boiling point of said solvent, the melting point of said active ingredient or the melting point of said carrier molecule.

13. The chemical screening method of claim 12, wherein said active ingredient and said carrier molecule are completely co-dissolved under a pressure of substantially one (1) atmosphere.

14. The chemical screening method of claim 3, wherein a temperature is maintained in the range between about zero (0) degrees celsius and the lowest among the boiling point of said solvent, the melting point of said active ingredient or the melting point of said carrier molecule during spin-casting.

15. The chemical screening method of claim 3, wherein a pressure of substantially one (1) atmosphere is maintained during spin-casting.

16. The chemical screening method of claim 3, wherein a rotational speed is maintained in a range of one (1) to 5,000 rotations per minute during spin-casting.

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17. The chemical screening method of claim 3, further comprising the step of using ellipsometry to determine the film thickness to ensure the accuracy of X-ray diffraction, RAMAN microscopy, infrared microscopy, spectroscopy and the dielectric.

18. The chemical screening method of claim 3, further comprising the step of using RAMAN microscopy, atomic force microscopy, electron microscopy, spectroscopy, X-ray diffraction, dielectric measurements and thermal analysis to confirm and improve the results obtained using optical microscopy;

19. The chemical screening method of claim 3, further comprising the step of using visual examination of the solid dispersion thin films for determining morphology and color.

20. The chemical screening method of claim 3, further comprising the step of constructing an equilibrium phase diagram for each solution wherein the temperature is plotted on a Y axis and the active ingredient to carrier ratios are plotted on an X axis.

21. The equilibrium phase diagram of claim 20, further including the step of constructing at least one solubility limit curve.

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22. The chemical screening method of claim 3, further comprising the preparation of a mosaic phase diagram by horizontally placing the optical micrographs sequentially from lowest to highest molar weight ratio across the X-axis of an equilibrium phase diagram at a given temperature found on the Y axis and repeating the process until all micrographs at any subsequent temperatures are placed in the proper orientation on said X-axis and said Y-axis.

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